

CLAIMS

What is claimed is:

1. A bearing apparatus for a wheel of a vehicle comprising:
 - an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange, an inner ring fitted on the cylindrical portion;
 - an outer member arranged around the inner member;
 - double row rolling elements freely rollably contained between the inner and outer members;
 - the inner ring being secured in an axial direction relative to the wheel hub by a caulked portion, said caulked portion formed by radially outwardly deforming the end of the cylindrical portion of the wheel hub; and
 - a chamfered outer circumferential surface of a back side of the inner ring is formed as a cut surface machined after heat treatment of the inner ring.
2. The bearing apparatus for a wheel of a vehicle according to claim 1 wherein the wheel hub is formed with an inner raceway surface on its outer circumferential surface and said wheel hub outer circumferential region from a base of the wheel mounting flange to the cylindrical portion through the inner raceway surface is hardened by high frequency induction hardening to have a surface hardness of 54~64 HRC, said caulked portion remains as a non-quenched portion having a surface hardness less than 24 HRC after forging, and hoop stress generated within the inner

ring by plastic deformation of the end of the cylindrical portion is limited to less than 300 MPa.

3. A method for manufacturing a bearing apparatus for a wheel of a vehicle comprising:

providing an inner member including a wheel hub having an integrally formed wheel mounting flange at one end and a cylindrical portion axially extending from the wheel mounting flange, an inner ring fitted on the cylindrical portion; an outer member arranged around the inner member, and double row rolling elements freely rollably contained between the inner and outer members;

securing the inner ring in an axial direction relative to the wheel hub;

radially outwardly deforming the end of the cylindrical portion of the wheel hub forming a caulked portion;

recutting a chamfered outer circumferential surface of a back side of the inner ring after heat treatment of said inner ring.

4. The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 3 wherein said recutting of the chamfered outer circumferential surface of the back side of the inner ring is re-cut by a hardened steel cutting tool after said heat treatment.

5. The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 3 wherein said recutting of the chamfered outer

circumferential surface of the back side of the inner ring is re-cut by a grinding stone and at least simultaneously cutting an outer circumferential surface of a larger diameter end of the inner ring.

6. The method for manufacturing a bearing apparatus for a wheel of a vehicle according to claim 5 wherein said recutting of the chamfered outer circumferential surface of the back side of the inner ring is re-cut by a grinding stone and at least simultaneously cutting a backside end face of a front side of the inner ring and an inner raceway surface of the inner ring.